Mounting and Operating Instructions

Solenoid Valves Type 3963

Fig. 1

Edition: February 2014

EB 3963 EN

Contents

General notes 3
Model number and device index 3

Mounting 3
Rail mounting 4
Wall mounting 4
Mounting to rotary actuators with NAMUR interface according to VDI/VDE 3845 5
Mounting with adapter plate to linear actuators with NAMUR rib according to IEC 60534-6-1 6
Mounting with CrNiMO steel pipe fittings to linear actuators 6
Mounting to connection block for SAMSON Type 3277 Linear Actuator 7
Mounting to linear actuators with NAMUR rib according to IEC 60534-6-1 7

Air connection 8
Supply pipe 8
Operating medium for the booster valve 8
Air supply for the pilot valve 8
Conversion to external air supply via connection 9 9
Exhaust air return 10
Restrictors 10

Electrical connection 11
Connecting cables 11
Degree of protection 12
Manual override 12
Equipment for use in zone 2 12

Servicing explosion-protected devices 13

Maintenance, calibration and work on equipment 13

Certifications 14
EC Type Examination Certificate PTB 01 ATEX 2085 14
Statement of Conformity PTB 01 ATEX 2086 X 18
Certificate of Compliance (CSA Approvals) 21
Certificate of Compliance (FM Approvals) 24

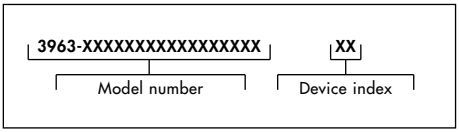
Addendum 26
Installation manual for apparatus approved by CSA and FM for use in hazardous locations 26

General notes

The device is to be assembled, started up or operated only by trained and experienced personnel familiar with the product. According to these mounting and operating instructions, trained personnel is referred to as individuals who are able to judge the work they are assigned to and recognize possible dangers due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.
Explosion-protected versions of this device are to be operated only by personnel who has undergone special training or instructions or who is authorized to work on explosion-protected devices in hazardous areas.
Any hazards that could be caused in the valve by the process medium, the signal pressure or by moving parts are to be prevented by means of the appropriate measures.
If inadmissible motions or forces are produced in the pneumatic actuator as a result of the supply pressure level, it must be restricted using a suitable supply pressure reducing station.
Proper shipping and appropriate storage are assumed.
For technical data, ordering data, spare parts and accessories see Data Sheet T 3963 EN.

Model number and device index

The model number and the device index are shown on the nameplate:



Mounting

Before mounting to actuators, all relevant parts of the plant must be depressurized.

Do not loosen enameled screws in or on the housing.
Using mounting kits, the devices can be mounted to rotary actuators, linear actuators and control valves with ribs. Then the relevant mounting instructions must be observed (see pages 4 ff.).
The devices can be mounted in any desired position. The filter in the enclosure cover and the cable gland must be installed hanging downwards, or if this is not possible, horizontally.

The required degree of protection according to IEC 60529:1989 can only be guaranteed when the enclosure cover is mounted, the exhaust air filters are installed and the connections are installed properly.

On mounting make sure that at least 300 mm space is left above the enclosure cover.
In locations where there is a risk of mechanical damage to the enclosure, the enclosure must be fitted with additional protection.

Rail mounting

▶ Type 3963-XXX0011/-XXX0012/
-XXX0111/-XXX1011/
-XXX8011

These devices can be attached with two mounting bases for G-profile rail 32 according to EN 50035 or top hat rail 35 according to EN 50022 (Fig. 2).

Wall mounting

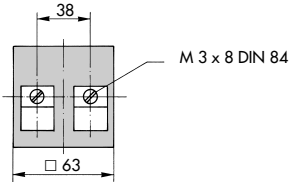
▶ Type 3963-XXX0011/-XXX0012/
-XXX0111/-XXX1011/
-XXX8011

These devices can be attached to a wall mounting plate (Fig. 2).

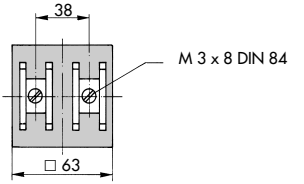
▶ Type 3963-XXXX013/-XXXX014

These devices can be attached with screws through bore holes (Fig. 3).

Mounting base for G-profile rail 32 (Order no. 1400-5930)



Mounting base for top hat rail 35 (Order no. 1400-5931)



Wall mounting plate (Order no. 1400-6726)

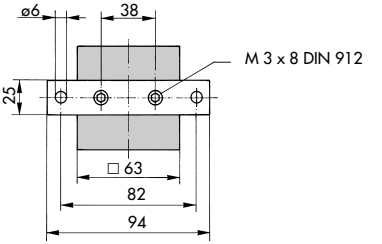
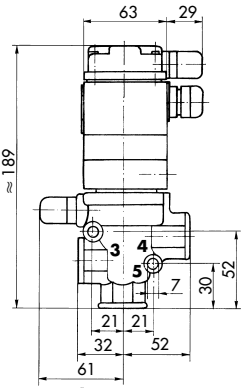


Fig. 2 · Dimensions in mm

Type 3963-XXXX014



Type 3963-XXXX013

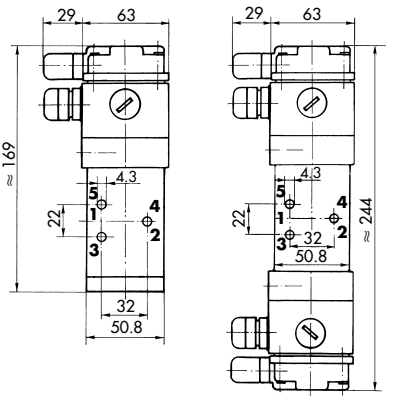


Fig. 3 · Dimensions in mm

Mounting to rotary actuators with NAMUR interface according to VDI/VDE 3845

▶ Type 3963-XXXXX0

These devices can be directly attached to rotary actuators with NAMUR interface (Fig. 4). Before mounting, check that the two O-rings are positioned correctly. The operation direction is determined by a threaded coding pin M 5 × 10 DIN 916 on the mounting flange of the rotary actuator. The device is attached with two screws M 5 × 35 ISO 4762. The mounting accessories are delivered together with the device.

NAMUR interface according to VDI/VDE 3845

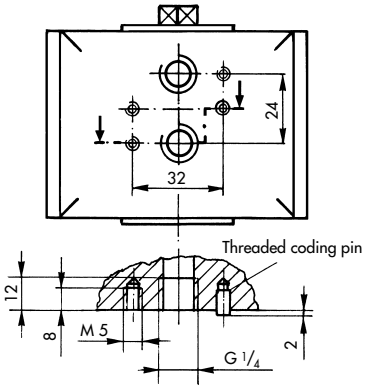


Fig. 4 · Dimensions in mm

Mounting with adapter plate to linear actuators with NAMUR rib according to IEC 60534-6-1

▶ Type 3963-XXX0X0
These devices can be mounted with an adapter plate (Fig. 5) to linear actuators with a NAMUR rib. When both a positioner and limit switch are to be mounted on linear actuators with nominal size ≤ DN 50, a bracket (Order no. 0320-1416) is required.

Mounting with CrNiMo steel pipe fittings to linear actuators

▶ Type 3963-XXX0X1X0/-XXX0X142
These devices can be mounted using a CrNiMo steel pipe fitting to linear actuators, e. g. SAMSON Type 3271 or 3277 (Fig. 6). Refer to Mounting and Operating Instructions EB 8310 EN and EB 8311 EN.

Adapter plate NAMUR rib/NAMUR interface (Order No. 1400-6751)

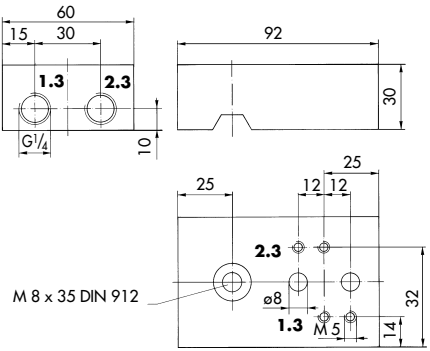
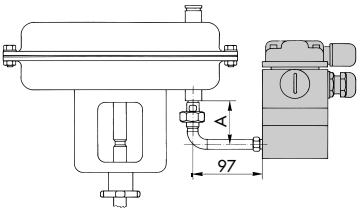
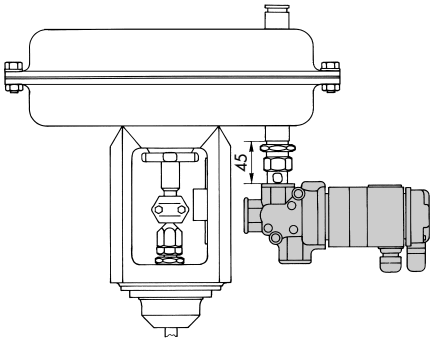


Fig. 5 · Dimensions in mm

Mounting with CrNiMo steel pipe fittings to linear actuators





Actuator size	Connection	A	Order no.
80/240 cm²	G 1/4 / 1/4	64	**1400-6759**
350/700 cm²	G 3/8 / 1/4	75	**1400-6761**
	G 3/8 / 1/2	64	**1400-6735**

Actuator size	Connection	Order no.
1400 cm²	G 3/4 / 1/2	**1400-6736**
2100 cm²	G 1 / 1/2	**1400-6737**
2800 cm²		

Fig. 6 · Dimensions in mm

Mounting to connection block for SAMSON Type 3277 Linear Actuator

▶ Type 3963-XXX0X3

These devices can be mounted to a connection block for SAMSON Type 3277 Linear Actuator with SAMSON Type 3730-X, 3731-X, 3766, 3767 or 378X Positioner (Fig. 7). Before mounting, check that the four O-rings are positioned correctly on the mounting flange. The device is attached with two screws M 5 × 55 ISO 4762. The mounting accessories are delivered together with the device. Refer to mounting and operating instructions of the corresponding SAMSON devices.

Mounting to linear actuators with NAMUR rib according to IEC 60534-6-1

▶ Type 3963-XXX002

This device can be directly mounted to a linear actuator with NAMUR rib. The device is attached with a screw M 8 × 35 ISO 4762 which is delivered with the device.

Mounting to connection block for SAMSON Type 3277 Linear Actuator

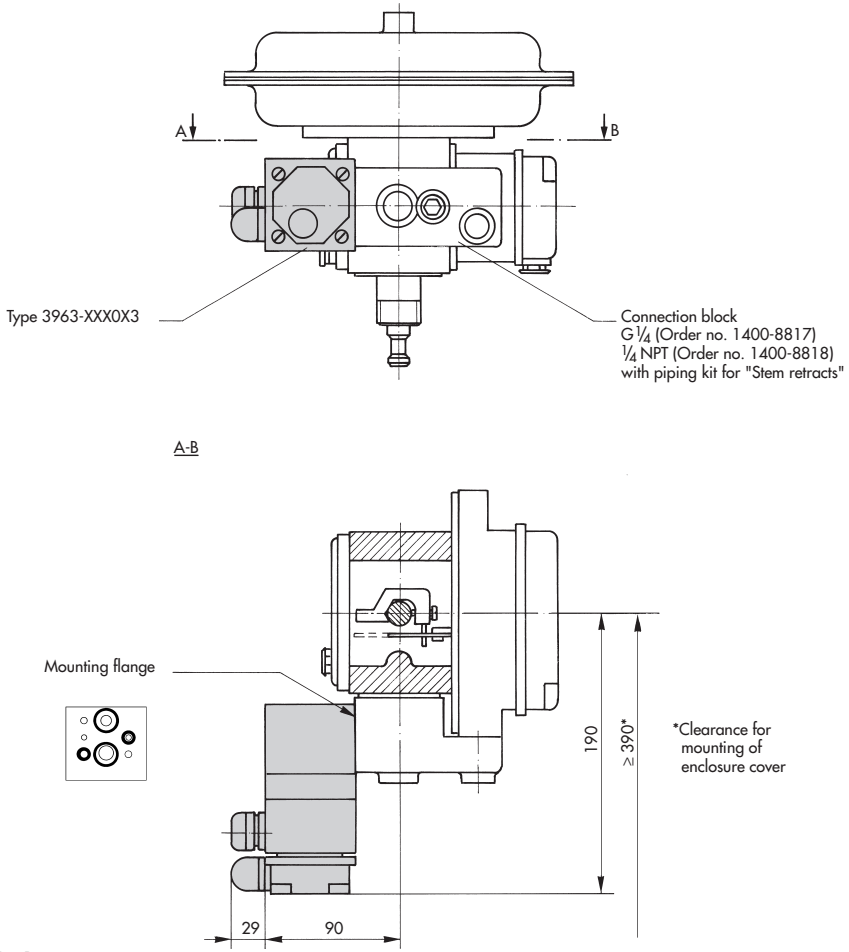


Fig. 7 · Dimensions in mm

Air connection

The air supply pipes and screw fittings must be mounted by experienced personnel only.
They must be regularly checked for leakage and damage, and if necessary, repaired. Before starting any repair work, all supply pipes which are to be opened must be depressurized.

The air connections are G (NPT) $^1/_4$ or G (NPT) $^1/_2$ tapped holes depending on the version.
The exhaust air connections must be protected against water and dust by using filters or other suitable measures.

Note: The K_{VS} value of a pressure reducer connected upstream must be at least 1.6 times larger than the K_{VS} value of the device.

Supply pipe

The minimum required nominal size of the supply pipe is shown in the following table:

Nominal size (Supply pipe length ≤ 2 m)				
Pressure (bar)	K_{vs} value			
	0.16 0.32	1.4	2.0 4.3	–
	Connection			
	4	1 and 3	4	9
≥ 1.4	≥ DN 6	≥ DN 8	≥ DN10	≥ DN 4
≥ 2.5	≥ DN 4	≥ DN 6	≥ DN 8	
≥ 6		≥ DN 4	≥ DN 6	

Note: Larger nominal sizes must be used for supply pipe lengths over 2 meters.

▶ Type 3963-XXXX0X3/-XXXX014
In the aboved listed devices, it is possible to check whether the nominal size of the supply pipe is sufficient as follows:
1. Unscrew the screw plug covering connection 9 and connect a pressure gauge.
2. The nominal size of the supply pipe proves to be sufficient when there is a pressure of ≥ 1.3 bar during the switching process.

Operating medium for the booster valve

With internal air supply:
Instrument air, free of corrosive particles, or nitrogen, pressure 1.4 to 6 bar.

With external air supply via connection 9 (see pages 9 ff.):
Instrument air, free of corrosive particles, oil-containing air or noncorrosive gases, pressure 0 to 6 bar (0 to 10 bar for K_{VS} value 1.4 or 4.3 with air supply via connection 4).

Air supply for the pilot valve

Instrument air, free of corrosive particles, or nitrogen, pressure 1.4 to 6 bar.

The air supply must not exceed the maximum permissible pressure and, if necessary, it must be limited by a pressure reducer.

Quality of compressed air according to ISO 8573-1		
Particle size and density	Oil contents	Pressure dew point
Class 4	Class 3	Class 3
≤ 5 µm and 1 000/m³	≤ 1 mg/m³	−20 °C or at least 10 K below the lowest ambient temperature to be expected

Note for using nitrogen:

When the devices are to be mounted in closed, unventilated rooms, the exhaust air of pilot valves or booster valves must be vented to the outside over a central pipe.

Conversion to external air supply via connection 9

When the output signal (0 to 6 bar) of a positioner has to be switched by the solenoid valve, the air supply is to be connected external via connection 9.

▶ Type 3963-XXXX004/-XXXX007/ -XXXX014

In these devices, if not otherwise specified, the air supply is connected internally via connection 4. It can be converted to an external air supply via connection 9 (Fig. 8) as follows:

1. Unscrew the filister head screw and remove plate ① and gasket ② from the connecting plate.
2. Turn gasket ② by 90°. The **tab** of gasket ② is then placed **in cutout "9" of the connecting plate.**
3. Refasten plate ① and gasket ② to the connecting plate.

Note: In these devices, the flat gasket must be inserted as described for "Internal air supply via connection 4" (Fig. 10, page 10).

▶ Type 3963-XXXX0X3/-XXXX006

In these devices, if not otherwise specified, the air supply is connected internally via connection 1 or 3. It can be converted to an external air supply via connection 9 (Fig. 9) as follows:

1. Unscrew the filister head screw and remove plate ① and gasket ② from the connecting plate.
2. Turn gasket ② by 180°. The **tab** of gasket ② is then placed **in cutout "9" of the connecting plate.**
3. Refasten plate ① and gasket ② to the connecting plate.

Note: In case of double actuated booster valves, this conversion must be performed in both pilot valves.

Installation of the gasket for Type 3963-XXXX004/-XXXX007/ -XXXX014

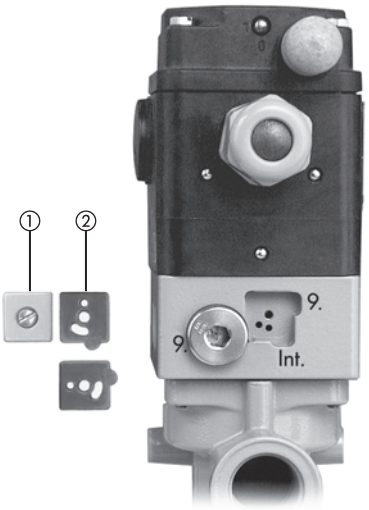


Fig. 8

Installation of the gasket for Type 3963-XXXX0X3/-XXXX006

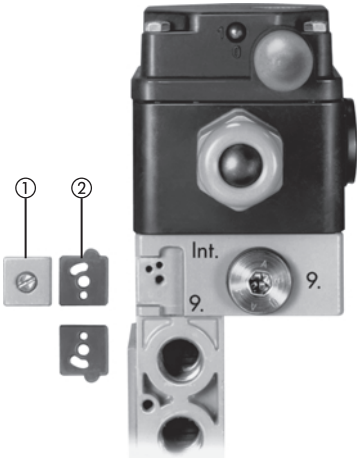


Fig. 9

▶ Type 3963-XXX0002/-XXX0012/
-XXX0022/-XXX1011

In these devices, if not otherwise specified, the air supply is connected internally via connection 4. It can be converted to an external air supply via connection 9 (Fig.10) as follows:

1. Unsrew the four filister head screws and remove enclosure cover.
2. Unsrew the three hexagon socket head screws and remove solenoid valve from the adapter plate.
3. Turn flat gasket by 180°. The **tab** of the flat gasket is then placed **in cutout "9" of the enclosure**.
4. Refasten solenoid valve and adapter plate.

▶ Type 3963-XXX0001/-XXX0011/
-XXX0032/-XXX0101/
-XXX0111/-XXX0131/
-XXX1001/-XXX1201/
-XXX8001

The air supply cannot be diverted in these devices. The flat gasket, if provided, must be inserted as described for "Internal air supply via connection 4" (Fig. 10).

Exhaust air return

▶ Type 3963-XXX0013X

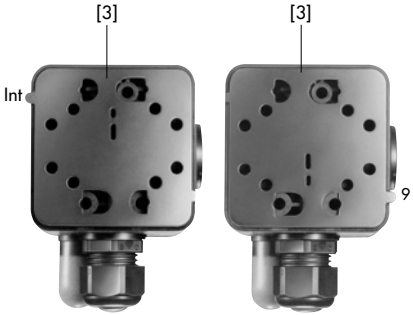
The connection 4 is sealed by a screw plug in the delivered state. If the exhaust air return is used for spring-loaded actuators, the screw plug must be removed and connection 4 must be connected to the spring chamber of the actuator by a hose with nominal size DN 4 to 10 (depending on the actuator size).

Restrictors

▶ Type 3963-XXXX1/-XXXX2/-XXXX3

These devices have one or two restrictors. The restricting function can be identified from the symbol indicated on the device. Different closing and opening times can be adjusted in a ratio of 1:15 by turning the restricting screws clockwise or counterclockwise with a screwdriver. The restricting screws can be found underneath the enclosure cover or at the adapter plate (Fig. 11).

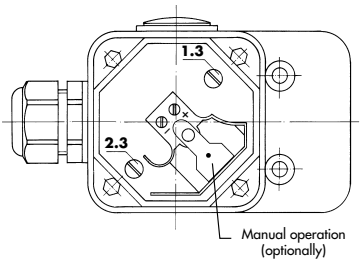
Installation of the flat gasket for Type 3963-XXX0002/-XXX0012/ -XXX0022/-XXX1011



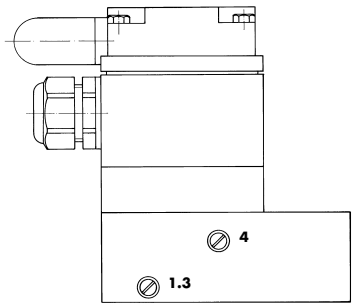
Internal air supply via connection 4 | External air supply via connection 9

Fig. 10

Setting of the restrictors



Type 3963-XXXX1/-XXXX2



Type 3963-XXXX3

Fig. 11

Electrical connection

For electrical installation, observe the relevant electrotechnical regulations and the accident prevention regulations of the country of use.
The following regulations apply to installation in hazardous areas: EN 60079-14:2008 (VDE 0165-1) "Explosive Atmospheres – Electrical Installations Design, Selection and Erection".
For connection to certified intrinsically safe electric circuits, the EC Type Examination Certificate PTB 01 ATEX 2085 for zone 1 and Certificate of Conformity PTB 01 ATEX 2086 X for zone 2 applies (see pages 14 ff.).

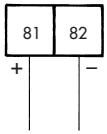
Adhere to the terminal assignment. Switching the assignment of the electrical terminals may cause the explosion protection to become ineffective.

Do not loosen enameled screws in or on the housing.
The maximum permissible values specified in the EC type examination certificates apply when interconnecting intrinsically safe electrical equipment (U_i or U_0, I_i or I_0, P_i or P_0, C_i or C_0 and L_i or L_0).

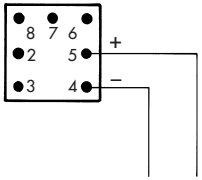
Connecting cables

The power supply is connected either through a cable gland M 20 × 1.5 to terminals in the enclosure or with a plug-type connector (see Fig. 12).
Observe clause 12 of EN 60079-14:2008 (VDE 0165-1) for installation of the intrinsically safe circuits.
Clause 12.2.2.7 applies when running multicore cables and wires with more than one intrinsically safe circuit.
It is recommended that connecting cables with a conductor cross-section of 0.5 mm^2 and an external diameter of 6 to 12 mm are used. The radial thickness of the isolation of a conductor for common insulating materials (e.g. polyethylene) must not be smaller than 0.2 mm. The diameter of an individual wire in a fine-stranded conductor must not be smaller than 0.1 mm. Protect the conductor ends against splicing, e.g. by using wire-end ferrules.
When two separate cables or wires are used for connection, an additional cable gland can

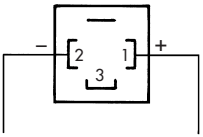
Connection diagrams



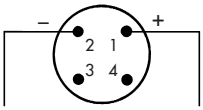
Terminals in the enclosure



Female connector (manufactured by Harting)



Female connector acc. to EN 175301-803



Female connector M 12 × 1

Fig. 12

be installed. Seal cable entries left unused with plugs.
Fit equipment used in ambient temperatures below −20 °C with metal cable entries.

Degree of protection

The devices can be changed from degree of protection IP 54 to degree of protection IP 65 by exchanging the filter in the enclosure cover.

Manual override

The devices have a manual override as an alternative to allow the device to be manually operated when a nominal signal is not available:
- Switch in the enclosure cover
- Push button in the enclosure cover
- Pushbutton underneath enclosure cover (see page 10, Fig. 11)

Note: For **safety circuits,** only devices **without manual override** should be used.

Equipment for use in zone 2

In equipment operated according to type of protection Ex nA II (non-sparking equipment) according to EN 60079-15:2003, circuits may be connected, interrupted or switched while energized only during installation, maintenance or repair.

Servicing explosion-protected devices

If a part of the device on which the explosion protection is based needs to be serviced, the device must not be put back into operation until a qualified inspector has assessed it according to explosion requirements, has issued an inspection certificate or given the device a mark of conformity.
Inspection by a qualified inspector is not required if the manufacturer performs a routine test on the device prior to putting it back into operation. Document the passing of the routine test by attaching a mark of conformity to the device.
Replace explosion-protected components only by original, routine-tested components from the manufacturer.
Devices that have already been used outside hazardous areas and are intended for future use inside hazardous areas must comply with the safety requirements placed on serviced devices. Before being operated inside hazardous areas, test the devices according to the specifications for "Servicing explosion-protected devices".

Maintenance, calibration and work on equipment

Interconnection with intrinsically safe circuits to check or calibrate the equipment inside hazardous areas is to be performed only with intrinsically safe current/voltage calibrators and measuring instruments to rule out any damage to components relevant to explosion protection.
Observe the maximum permissible values specified in the certificates for intrinsically safe circuits (see pages 14 ff.).

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

PTB

Ex

TRANSLATION

(1) **EC TYPE EXAMINATION CERTIFICATION**

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres – **Directive 94/9/EC**

(3) EC Type Examination Certificate Number

PTB 01 ATEX 2085

(4) Equipment: Model 3963-1.. Solenoid Valve

(5) Manufacturer: SAMSON AG

(6) Address: Weismüllerstr. 3, D-60314 Frankfurt, Germany

(7) The equipment and any acceptable variations thereof are specified in the schedule to this certificate.

(8) The Physikalisch-Technische Bundesanstalt, notified body number 0102 according to Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres specified in Annex II to the Directive.

The examination and test results are recorded in confidential report: **PTB Ex 01-21061**

(9) The Essential Health and Safety Requirements are satisfied by compliance with

EN 50014: 1997 **EN 50020: 1994**

EC Type Examination Certificates without signature and seal are invalid.
This EC Type Examination Certificate may only be reproduced in its entirety and without any changes, schedule included.
Extracts or changes shall require the prior approval of the Physikalisch-Technische Bundesanstalt.

Physikalisch-Technische Bundesanstalt., Bundesallee 100, D-38116 Braunschweig

Ptb23-3963.doc

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use as specified in the schedule to this certificate.

(11) According to the Directive 94/9/EC, this EC TYPE EXAMINATION CERTFICATE relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

(12) The marking of the equipment shall include the following:

II 2 G EEx ia IIC T6

Zertifizierungsstelle Explosionsschutz Braunschweig, 8. August 2001
By order

(Signature) (Seal)

Dr. Ing. U. Johannsmeyer
Regierungsdirektor

EC Type Examination Certificates without signature and seal are invalid.
This EC Type Examination Certificate may only be reproduced in its entirety and without any changes, schedule included.
Extracts or changes shall require the prior approval of the Physikalisch-Technische Bundesanstalt.

(13) # Schedule

(14) **EC TYPE EXAMINATION CERTIFICATE No. PTB 01 ATEX 2085**

(15) **Description of Equipment**

The Model 3963-1.. Solenoid Valve converts electrical binary signals in the input circuit into pneumatic output signals. It is intended for attachment to actuators and for constructing control systems.

It may be installed inside and outside of hazardous areas.

The Model 3963-1.. Solenoid Valve is a passive two-terminal network that may be connected to any certified intrinsically safe circuit, provided the permissible maximum values of U_i, I_i and P_i are not exceeded.

By connection of suitable series dropping resistors the Model 3963-1.. Solenoid Valve can accommodate nominal voltages of 6, V, 12 V and 24 V.

Electrical data

Signal circuit normal signal ... Type of protection: Intrinsic Safety EEx ia IIC

The correlation between version, temperature classification, permissible maximum ambient temperature ranges and maximum power dissipation is shown in the table below:

Version (U_N)		**6V**	**12V**	**24V**
Temperature class	T6 T5 T4	60°C -45°C ≤ T_a ≤ 70°C 80°C		
Characteristic linear or rectangular	P_i	#	##	
C_i negligible, L_i negligible				

\# The permissible maximum power dissipation Pi in the 6 V version is 250 mW.

\## The maximum values for connection to a certified intrinsically safe circuit are shown in the table below:

EC Type Examination Certificates without signature and seal are invalid.
This EC Type Examination Certificate may only be reproduced in its entirety and without any changes, schedule included.
Extracts or changes shall require the prior approval of the Physikalisch-Technische Bundesanstalt.

U_i	25V	27V	28V	30V	32V
I_i	150mA	125mA	115mA	100mA	85mA
P_i	no limitation				
C_i negligible, L_i negligible					

(16) Test Report **PTB Ex 01-21061**

(17) Special conditions for safe use

None

(18) Special Health and Safety Requirements

In compliance with the standards specified above.

Zertifizierungsstelle Explosionsschutz
By order

Braunschweig, 8 August 2001

(Signature) (seal)

Dr. Ing. U. Johannsmeyer
Regierungsdirektor

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Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

PTB

TRANSLATION

(1) **Statement of Conformity**

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres – **Directive 94/9/EC**

(3) EC Type Examination Certificate Number

PTB 01 ATEX 2086 X

(4) Equipment: Model 3963-8.. Solenoid Valve

(5) Manufacturer: SAMSON AG Mess- und Regeltechnik

(6) Address: Weismüllerstr. 3, 60314 Frankfurt am Main, Germany

(7) The equipment and any acceptable variation thereof are specified in the schedule to this certificate and the documents referred to therein.

(8) The Physikalisch-Technische Bundesanstalt, notified body number 0102 according to Article 9 of the Council Directive 94/9/ of 23 March 1994, certifies that this equipment has been found to comply with the essential health and safety requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres specified in Annex II to the Directive.

The examination and test results are recorded in confidential report.

PTB Ex 01-21204

(9) The essential health and safety requirements are satisfied by compliance with

EN 50021: 1999

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use as specified in the schedule to this certificate.

(11) In complince with the Directive 94/9/Ex this Statement of Conformity relates only to the dessign and consturciton of the equipment specified. Further requirements of this Directive apply to manufacture and marketing of this equipment.

Ptb23 Exn.doc

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

PTB

(12) The marking of the equipment shall include the following:

II 3 G EEx nA II T6

Zertifizierungsstelle Explosionsschutz Braunschweig, 14 November 2001
By order

(Signature) (Seal)

Dr. Ing. U. Johannsmeyer
Regierungsdirketor

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Physikalisch-Technische Bundesanstalt Bundesallee 100 D-38116 Braunschweig

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Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

PTB

(13) **S c h e d u l e**

(14) **Statement of Conformity PTB ß01 ATEX 2086 X**

(15) **Description of Equipment**

The model 3963-8.. Solenoid Valve converts electrical binary signals in the input circuit into pneumatic output signals. It is intended for attachment to actuators and for constructing control systems.

The correlation between the version, temperature classification and permissible ambient temperature ranges is shown in the table below:

Version (U_N)		6V	12V	24V
Temperaturclass	T6	60°C		
	T5	-45°C ≤ T_a ≤ 70°C		
	T4	80°C		

(16) **Test report PTB Ex 01-21204**

(17) **Special conditions for safe use**

1. The Model 3963-8.. Solenoid valve shall be installed in an enclosure providing at least Degree of Protection IP 54 according to IEC Publication 60529:1989.

2. The wiring shall be connected in such a manner that the connection facilities are free of tensile and torsional load.

(18) **Special health and safety requirements**

In compliance with the standard specified above.

Zertifizierungsstelle Explosionsschutz Braunschweig, 14 November 2001
By order

(Signature) (seal)

Dr. Ing. U. Johannsmeyer
Regierungsdirektor

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Physikalisch-Technische Bundesanstalt Bundesallee 100 D-38116 Braunschweig

Ptb23 Exn.doc

CSA INTERNATIONAL

Certificate of Compliance

Certificate: 1607857 (LR 54227-15) **Master Contract:** 173246

Project: 1607857 **Date Issued:** 2005/09/16

Issued to: **Samson AG**

Mess- Und Regeltechnik
Department E71
Weismuellerstrasse 3
Frankfurt, 60314
Germany
Attention: Holger Pflug

The products listed below are eligible to bear the CSA Mark shown

Issued by: Jimmy Lu

Authorized by: Nick Alfano, Operations Manager

PRODUCTS

CLASS 2258 04 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe, Entity - For Hazardous Locations

Ex ia IIC T6; Class I, Zone 0:

Class I, Division 1, Groups ABCD; Class II, Division 1; Groups E, F and G; Class III:

Model 3963 Solenoid Valve, Temperature Code T6 at ambient of +60°C, T5 at +70°C and T4 at +80°C; Type 4 Enclosure; Intrinsically safe when installed per Samson AG control installation drawing EB 3963 EN.

DQD 507 Rev. 2004-06-30

CSA INTERNATIONAL

Certificate: 1607857 (LR 54227-15) **Master Contract:** 173246

Project: 1607857 **Date Issued:** 2005/09/16

CLASS 2258 02 - PROCESS CONTROL EQUIPMENT - For Hazardous Locations

Class I, Div. 2, Groups A, B, C and D; Class II, Div 2, Groups E, F and G; Class III:

Model 3963 Solenoid Valve, input rated 6VDC/12 VDC/ 24 VDC, 22mA max, 20-150mW; Temperature Code T6 at ambient of +60°C, T5 at +70°C and T4 at +80°C; Type 4 Enclosure.

APPLICABLE REQUIREMENTS

CSA-C22.2 No. 25-1966 - Enclosures for Use in Class II, Groups E, F and G Hazardous Locations

CAN/CSA-C22.2 No. 94-M91 - Special Purpose Enclosures

CSA-C22.2 No.142-M1987 - Process Control Equipment

CAN/CSA C22.2 No. 157-1992 - Intrinsically Safe and Non-incendive Equipment for Use in Hazardous Locations

CSA C22.2 No. 213-M1987 - Non-incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations

CAN/CSA-E60079-0:02 - Electrical Apparatus for Explosive Atmospheres, Part 0 - General Requirements

CAN/CSA-E60079-11:02 - Electrical Apparatus for Explosive Atmospheres, Part 11 - Intrinsic Safety "i"

MARKINGS

- CSA Monogram;
- Submittor identification;
- Model number;
- Serial number or date code;
- Electrical rating/Entity parameters
- Hazardous location designation;
- Reference to installation drawing number;
- The Caution: "Warning - Substitution of Components May Impair Intrinsic Safety";
- Temperature code rating
- Maximum ambient

DQD 507 Rev. 2004-06-30

CSA INTERNATIONAL

Certificate:	1607857 (LR 54227-15)	**Master Contract:**	173246
Project:	1607857	**Date Issued:**	2005/09/16

- Certification year and Certificate number followed by an indicator 'X'

DQD 507 Rev. 2004-06-30

FM Approvals
Member of the FM Global Group

FM Approvals
1151 Boston Providence Turnpike
P.O. Box 9102 Norwood, MA 02062 USA
T: **781 762 4300** F: 781-762-9375 www.fmapprovals.com

CERTIFICATE OF COMPLIANCE

HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT

This certificate is issued for the following equipment

Model 3963-3abcd. Solenoid Valve with Model 1079-27 e/p Binary Converter Coil
IS / I,II,III / 1 / ABCDEFG / T6 Ta = 60°C - Addendum to EB 3963 EN, pages 4, 5 & 6; Entity; Type 4X
I / 0 / AEx ia IIC / T4 Ta = 80°C - Addendum to EB 3963 EN, pages 4, 5 & 6; Entity; Type 4X
NI / I / 2 / ABCD / T4 Ta = 80°C; S / II,III / 2 / FG / T4 Ta = 80°C; Type 4X

Entity Parameters:
Vmax (Ui) = 28V, Imax (Ii) = 115mA, Pmax (Pi) = 0.25W, Ci = 0, Li = 0
Solenoid Valve (nominal signal) 6VDC version Pmax (Pi)=250mW
Solenoid valve (nominal signal) 12VDC and 24VDC version Pmax (Pi) not limited

a = Nominal signal: 1 (6 volts), 2 (12 volts) or 3 (24 volts).
b = Pneumatic switching functions: attachment with or without functional test.
c = Ambient temperatures: 0 (= -20°C +80°C) or 1 (= - 45°C +80°C).
d = Electrical Connection: Connection thread type of protection or manual operation.

Equipment Ratings:

The apparatus was evaluated as intrinsically safe electrical apparatus with Entity requirements for use in Class I, II, III, Division 1, Groups A, B, C, D, F and G and alternatively for Class I, Zone 0, AEx ia IIC in accordance with manufacturing installation manuals; non incendive for Class I, Division 2, Groups A, B, C and D; suitable for Class II, Division 2, Groups F and G indoor/outdoor Type 3R hazardous (classified) Locations.

FM Approved for:

Samson AG
D-60314 Frankfurt, Germany

This certifies that the equipment described has been found to comply with the following Approval Standards and other documents:

Class 3600	1998
Class 3610	2010
Class 3611	2004
Class 3810	2005
NEMA-250	1991
ANSI/ISA-60079-0	2009
ANSI/ISA-60079-11	2009

Original Project ID: 3020228 Approval Granted: February 28, 2005

Subsequent Revision Reports / Date Approval Amended

Report Number	Date	Report Number	Date
3042057	June 6, 2011		

FM Approvals LLC

Timothy Adam
Technical Team Manager

June 6, 2011
Date

Installation Manual for apparatus certified by CSA for use in hazardous locations.

Electrical rating of intrinsically safe apparatus and apparatus for installation in hazardous locations.

Table 1: Maximum values Solenoid valve

	U_i or V_{max}	I_i or I_{max}	P_i or P_{max}	C_i	L_i
12V/24V version	28V	115mA	not limited	0 nF	0 µH
6 V version	28V	115mA	250mW	0 nF	0 µH

U_0 or $V_{0C} \leq U_i$ or V_{max} I_0 or $I_{0C} \leq I_i$ or I_{max} $P_0 \leq P_i$ or P_{max}; $C_a \geq C_i$ and $L_a \geq L_i$

Table 2CSA - certified barrier parameters of solenoid valve circuit

Barrier	Supply barrier		Evaluation barrier	
	V_{max}	R_{min}	V_{max}	
12V/24 V version	≤ 28V	≥ 280Ω	≤ 28V	Diode Return
6 V version	≤ 28V	≥ 280Ω	28V	Diode Return

Table 3: The correlation between temperature classification and permissible ambient temperature ranges is shown in the table below:

Temperature class	Permissble ambient temperature range
T6	- 45°C ... 60°C
T5	- 45°C ... 70°C
T4	- 45°C ... 80°C

Revisions Control Number: 1 May 05 **Addendum to EB 3963 EN**

Intrinsically safe if installed as specified in manufacturer's installation manual.

CSA-certified for hazardous locations

Ex ia IIC T6; Class I, Zone 0
Class I; Groups A, B, C, D;
Class II; Groups E, F + G; Class III **Type 4 Enclosure**

Notes:

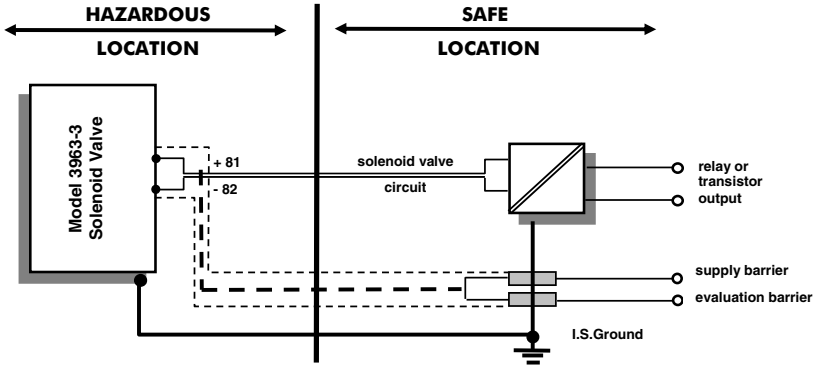
1.) The apparatus may be installed in intrinsically safe circuits only when used in conjunction with the CSA certified apparatus.

2.) For maximum values of $\mathbf{U_i}$ **or** $\mathbf{V_{max}}$; $\mathbf{I_i}$ **or** $\mathbf{I_{max}}$; $\mathbf{P_i}$ **or** $\mathbf{P_{max}}$; C_i and L_i of the various apparatus see Table 1 on page 1.

3.) For barrier selection see Table 2 on page 1.

4.) Installation shall be in accordance with the Canadian Electrical Code Part

5.) Use only supply wires suitable for 5°C above surrounding temperature.



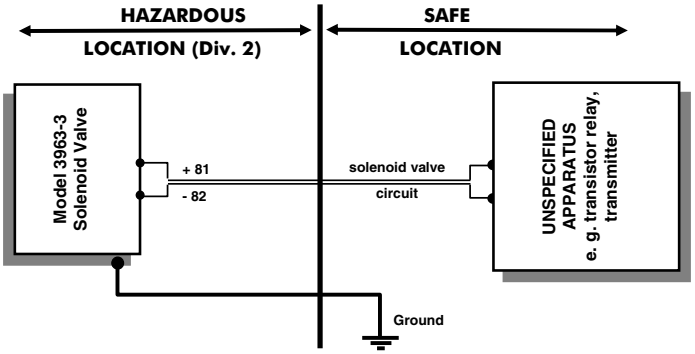
Version: Model 3963-3 Solenoid Valve.

Supply and evaluation barrier CSA- certified.

Cable entry M 20 x 1.5 or metal conduit according to drawing No. 1050 – 0539 T or 1050 – 0540 T

CSA- certified for hazardous locations

Class I; Div. 2, Groups A, B, C, D
Class II; Div. 2, Groups E, F + G, Class III **Type 4 Enclosure**



Notes:
1.) Cable entry only rigid metal conduit according to drawing No. 1050-0539 T and 1050-0540 T

Installation Manual for apparatus approved by FM for use in hazardous locations.

Electrical rating of intrinsically safe apparatus and apparatus for installation in hazardous locations.

Table 1: Maximum values

	U_i or V_{max}	I_i or I_{max}	P_i or P_{max}	C_i	L_i
Solenoid valve 12V/24 V version	28V	115mA	No limitation	0nF	0 µH
Solenoid valve 6 V version	28V	115 mA	250mW	0nF	0 µH

Notes: U_0 or V_{0C} or $V_t \leq U_i$ or V_{max} / I_0 or I_{SC} or $I_t \leq I_i$ or I_{max}
P_0 or $P_{max} \leq P_i$ or P_{max}

Table 2: FM - approved barrier parameters of solenoid valve circuit

Barrier	Supply barrier			Evaluation barrier		
	V_{0C}	R_{min}	I_{SC}	V_{0C}	R_{min}	I_{SC}
Solenoid valve 12V/24 V version	≤ 28V	≥ 240Ω	≤ 115mA	≤ 28V	#	0mA
Solenoid valve 6 V version	≤ 28V	≥ 785Ω	≤ 115mA	≤ 28V	#	0mA

Table 3: The correlation between temperature classification and permissible ambient temperature ranges is shown in the table below:

Temperature class	Permissble ambient temperature range
T6	60℃
T5	- 45℃ ≤ ta ≤ 70℃
T4	80℃

WARNING! In hazardous areas, make sure to install and service the device in such a way that electrostatic charging cannot take place.

Intrinsically safe if installed as specified in manufacturer's installation manual.

FM- approved for hazardous locations

Class I; Zone 0; A Ex ia IIC T6
Class I, II, III; Division 1; Groups A, B, C, D, E, F + G

NEMA 4X

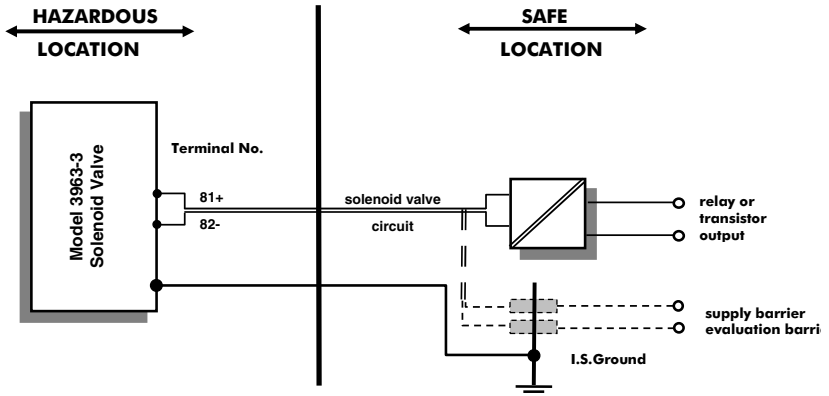
Notes:

1.) The apparatus may be installed in intrinsically safe circuits only when used in conjunction with the FM approved apparatus. For maximum values of U_i or V_{max} ; I_i or I_{max}; P_i or P_{max} ; C_i and L_i of the various apparatus see Table 1.

2.) The apparatus may be installed in intrinsically safe circuit only when used in conjunction with the FM approved intrinsically safe barrier. For barrier selection see Table 2.

3.) Installation shall be in accordance with the National Electrical Code ANSI/NFPA 70 and ANSI/ISA RP 12.06.01

4.) Use only supply wires suitable for 5°C above surrounding temperature.



Version: Model 3963-3 solenoid valve.

Supply and emulation barrier FM/CSA- approved.

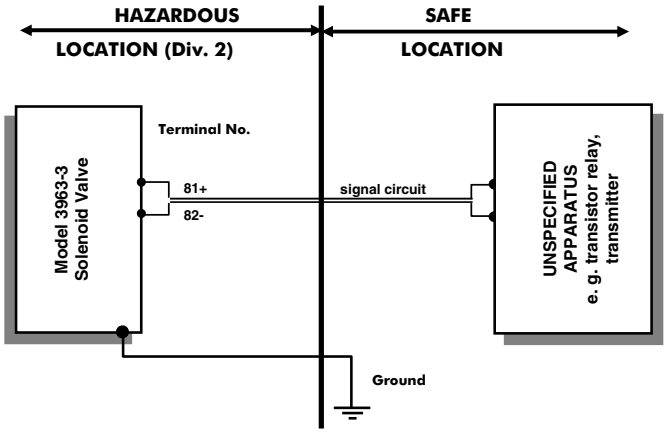
For the permissible maximum values for the intrinsically safe circuit see Table 1
For the permissible barrier parameters for the circuit see Table 2

Cable entry M 20 x 1.5 or metal conduit according to drawing No. 1050 – 0539 T or 1050 – 0540 T

FM- approved for hazardous locations

Class I; Division 2; Groups A, B, C, D
Class I;.Class II Division 2; Groups F + G; Class III

NEMA 4X



Notes:

1.) For the maximum values for the individual circuit see Table 1 and 2.

2.) Cable entry only rigid metal conduit according to drawing No. 1050-0539 T and 1050-0540 T

3.) The installation shall be in accordance with the National Electrical Code ANSI/NFPA 70

(Specifications subject to change without notice.)

SAMSOMATIC GMBH

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2014-02 · EB 3963 EN